

**2011-12 Gates: Pre-College Math Grant HCC\_APP8063****Status: Submitted****Applicant Information****Organization:** Highline Community College**Consortium:** No**Contact:**

**Name:** Lisa Peterson  
**Title:** Director of Budget  
**Address:** 2400 S. 240th Street  
PO Box 98000 MS 99-281  
Des Moines, WA 98198  
**Phone:** (206) 878-3710  
**Fax:** (206) 870-4848  
**Email:** lpeterson@highline.edu

**Secondary  
Contact:**

**Name:** Helen Burn  
**Title:** Instructor Dept of Mathematics  
**Phone:** (206) 878-3710  
**Email:** hburn@highline.edu

## Contents

### Section 1

#### Project Participation

**1A. Provide an updated list of the college faculty/staff who are \*core team members\* involved in leading and/or implementing the project.**

Dr. Rolita Ezeonu, Dean of Pre-college and Transfer, rezeonu@highline.edu

Darryl Brice, Department of Sociology, dbrice@highline.edu

Dr. Helen Burn, Department of Mathematics, hburn@highline.edu

Barbara Hunter, Department of Mathematics, bhunter@highline.edu

Diana Lee, Department of Mathematics, dlee@highline.edu

Erik Scott, Department of Mathematics, escott@highline.edu

Aaron Warnock, Department of Mathematics, awarnock@highline.edu

**1B. Estimate the approximate percentage of math department members (full-time and part-time/adjunct \*separately\*) who have participated in some kind of project-related activity (campus events, use of CATs, classroom exchanges, etc.).**

Full-time: 69% (9/13)

Part-time: 60% (9/15)

## Section 2

### Progress Report on Project Activities and Challenges

**2A. One of our core project themes is to make learning and teaching “visible” through incorporating the common practices of 1) \*classroom observations/exchanges\* and 2) \*classroom assessments\* into 3) \*faculty inquiry\* efforts at each of the project colleges. Describe to what extent and in what ways you have incorporated these three areas of practice into your project over the past year, including who in the department has been involved with each area.**

The three practices listed above were woven together as part of our faculty inquiry groups (FIGs). Each quarter, we organized two FIGs – one for instructors teaching Math 81 and one for those teaching Math 91. They were overseen by the lead instructors for those two courses, Diana Lee and Erik Scott. Participants in the FIGs were expected to attend 3 – 4 face-to-face meetings for collaborative discussion of pedagogy and student learning, use Classroom Assessment Techniques (CATs), and participate in reciprocal observations (classroom exchanges).

In fall everyone completed the tasks described above, but we identified several areas for improvement. We found it difficult to keep the discussions within the face-to-face meetings focused on the students’ learning process. This was largely because instructors learning our curriculum were focused on aspects of implementation, such as how to use the online homework system or how to score and report data about the mastery tests. The learning curve also meant that the reciprocal observations and CATs did not significantly deepen our discourse about student learning. Although nearly all instructors made a serious effort to complete the tasks, many felt overwhelmed by the number of things they were trying to implement, and therefore could not engage in them deeply.

Drawing upon our experiences in fall as well as conversations with Mickey Davis and Bill Moore, we modified the FIGs for winter. We continued the meetings but emphasized that the focus would be collaborative examination of student learning, with “faculty support” discussions taking place individually. The use of CATs and reciprocal observations were still encouraged, especially for faculty who had taught the course in fall. However, greater emphasis was placed on using CATs and observations as tools for examining student learning – to provide samples of student work that could be examined, and to generate questions for inquiry. These changes and larger number of faculty who had taught the new curriculum coincided with a greater focus on student learning. More faculty shared examples of student work, and we identified error patterns on the functions mastery test in Math 91 which prompted a revision of that test. To accommodate instructor schedules, we ran two Math 91 FIGS in that quarter.

The FIGs in winter quarter showed progress toward our goal of sustained inquiry into student learning, but also revealed the difficulty of getting faculty to “own” this process themselves. The lead instructors felt that participants looked to them to drive the FIG meetings, meaning that participants would often wait for a prompt rather than pose questions or describe their own inquiry activities. This occurred even when participants were given guidance about how to prepare for the meetings. Differences in instructors’ level of inquiry or reflection also made it difficult to engage in collaborative inquiry of a single topic.

The spring quarter FIGs operated more like those in winter quarter, deemphasizing CATs and observations while trying to help faculty engage in greater ongoing reflection on the teaching and learning in their individual classrooms. Drawing on our experiences in spring and previous quarters, we plan to make the following adjustments in the coming year. First, we need to focus on helping individuals develop a habit of investigating aspects of their students’ learning, akin to the assessment cycle of identifying goals, taking action, measuring achievement, and using the results to determine the next action. Second, we need to find tasks that provide greater insight into how students process the material – most of the written products we collect show symbolic manipulation, but reveal very little about the reasoning behind it. The “invisibility” of the students’ reasoning greatly limits the depth of our inquiry. Third, we plan to organize our FIG groups around inquiry topics rather than class level.

**2B. Describe other specific project-related activities you and your team have done since last summer; by the end of year 2 of the grant (August 31, 2011), what will your team have accomplished toward the overall stated goals of your project?**

Since our project involves the implementation of a new precollege curriculum that replaces all sections of our previous curriculum, most of our time was spent on activities related to this transition: advising students and colleagues, adjusting schedules, changing materials, providing training and support to instructors, and measuring the new curriculum’s impact. In fall, we offered the final sections of the old curriculum’s Math 97 course, and introduced the new Math 98 intermediate algebra course for students planning to take Calculus. As of winter quarter, all students – including those in Highline’s “Weekend College” – were enrolled in the new curriculum.

Building on the work of our Weekend College instructor, Colette Bailey, Diana and Aaron developed and taught hybrid and online versions of our new courses. The developmental math committee (Barbara, Diana, Erik, and Aaron) met throughout the year to identify and address issues such as clarifying learning outcomes and content expectations for faculty. Helen continued to lead the evaluation effort, obtaining data on student persistence and achievement throughout the quarter from each instructor. She also administered attitudinal surveys to students in all sections of Math 81 and 91 each quarter. Helen also kept abreast of

JAOG discussions related to pre-college mathematics. During summer of 2011, she coordinated a focus group for dev math students, facilitated by Darryl Brice (sociology) and Yoshiko Harden (student services).

Our remaining activities were typically grant-specific. We contributed to the RPM Wiki, and participated in conference calls and Elluminate sessions related to CATs and FIGs. Erik and Diana also had several conversations with Mickey Davis about changing faculty culture around examining student learning.

As we approach the end of year 2, we are making adjustments based on what we've learned from the first year of implementation. There is a general consensus among faculty that Math 91 contains too much content, so we are shifting the statistics topics into Math 81. This puts all the formal statistics training into Math 81, and allows Math 91 to more clearly focus on the concept of function. The mastery test on functions in Math 91 is being revised to more effectively target the specific abilities students should master. This is the result of discussion of trends in student performance on specific questions which took place in and outside of the FIGs. We are also revising our online materials archive and developing a new strategy for the FIGs.

Our stated goals for the curriculum were:

- (1) Reduce the number of pre-college courses needed by most students from three courses to two courses
- (2) Ensure the mathematical content is truly relevant to student's career, academic and life goals
- (3) Actively help students develop college-readiness skills, including successful learning habits and attitudes.

We have accomplished task 1, and made significant progress on tasks 2 and 3. All instructors have incorporated aspects of 2 and 3 into their teaching, but we need more feedback from students to determine how well they feel we've accomplished the second goal. And it is a bit too soon to determine the long-term impact of our efforts toward goal #3.

**2C. What have been the key challenges/obstacles you have encountered so far in organizing your team and the work of your project, and how are you addressing them? In particular, what challenges and issues have you encountered in considering and implementing the core practices in the context of the goals of your local project work?**

As mentioned in the response to 2A, our primary challenge has been creating a culture of collaborative inquiry. With the exception of one instructor, everyone has been willing to participate in the stated activities (e.g. FIGs, CATs, observations). However, these activities are not self-sustaining. Erik is developing a new approach to the FIG process for the coming year, and will use release time this fall to lead the implementation. Part of the new approach is to clearly separate faculty support from faculty inquiry by changing the role of the "lead

instructors.” During year 2, the lead instructors – Diana and Erik – oversaw both support and inquiry, while in year 3, the lead instructors – Barbara and Aaron – will focus on faculty support. And instead of having the FIGs be tied to a specific course, they will be organized around interest areas. Another major shift is to focus on helping individual faculty develop an inquiry mindset. This requires a framework that can be used by someone new to this process, and a method for generating productive conversations among people who are at different stages of engaging in inquiry. As people begin to examine their students’ learning more deeply, we will need training on relevant tools and strategies – ideally, this will lead to interest in, and use of, CATs and reciprocal observations.

Another (potential) challenge is how well students transition out of the Math 81/91 sequence. It’s too early for the data to answer this question, and anecdotal information is mixed. On the positive side, faculty teaching the subsequent courses are not reporting major gaps in students’ content knowledge, and enough students pass their subsequent course to avoid raising red flags. On the negative side, a number of faculty members have expressed concern about students’ reasoning and learning habits. This has led to the question of whether a subset of students who pass Math 91 genuinely need more time (like they had in the 3-quarter sequence) to develop both the content knowledge AND learning abilities they need to succeed.

## **2D. What else can the RPM project leadership do to help you address these challenges?**

The RPM leadership should develop a program that can be used by each project team to train faculty in inquiry into student learning. It should have a sequence of prompts, activities, and readings that can be followed by individual faculty members, with a goal of repeating and deepening the process over multiple quarters. (Internalization and “deep” inquiry would not be expected until at least the third iteration.) The program should also include a version that acknowledges the limited time and resources available to adjunct faculty. Emphasis should be put on using assessment as a window into student learning. For example, the institute and workshops have emphasized things like “group worthy tasks.” How are can such tasks be used to understand an individual students’ learning?

We would also encourage RPM leadership to apply for a second round of funding for this project. We view the lead instructors as essential to the implementation and believe two to three additional years of support could put us over the hump in achieving our instructional goals.

## Section 3

### Data and Evidence

#### **3A. With respect to student achievement or perspectives, what evidence have you gathered or compiled so far? How have you used (or how do you plan to use) that evidence to inform the work of your project?**

Evidence with respect to student achievement and perspectives derive from course pass rates, persistence rates, and student satisfaction surveys. This data is collected quarterly from faculty and students. Official pass rates derive from transcript data. This data is provided to the entire department on a quarterly basis, along with pass rates broken down by section. We also conducted a focus group with students during the summer of 2011. The focus group data, along with data on persistence, have not yet been thoroughly analyzed. Eventually, a third data point ? completion of college-level math (a Student Achievement Initiative momentum point) ? will be tracked and reported.

Overall, results are positive. During the 2010-11 academic year, pass rates in the redesigned Math 81 were 67% compared to an average historical pass-rate of 57%. For Math 91, pass rates averaged 62% compared to prior average of 52%. Retention rates hovered around 80% with the redesigned courses; we have no historical comparison.

Student satisfaction surveys (n=1670), administered quarterly and compared with an historical baseline (n=163), suggest improvements in general satisfaction, usefulness of course material, classroom climate, and resources. For example, 68% of spring quarter Math 81 students strongly agreed with the statement, Overall I am satisfied with this courses, compared to 37% of baseline students. In Math 91, 63% of baseline students disagreed that they found the math they were learning useful in their daily lives compared to a lower 40 to 50% of the redesign students. Similar positive changes have occurred on survey questions related to classroom climate, suggesting students are more comfortable asking questions in class and in seeking help outside of class.

The departmental response to the data has been guarded optimism: Our efforts are paying off, but there is room to grow. Positive gains in motivational variables are tempered by the finding that at least 30% of redesign students—and in some quarters closer to half—still disagree that the math they are learning is useful in their daily lives. As well, in some quarters only half the students strongly agreed they were comfortable asking questions during class. We also saw a slight downward trend between the first pilots (sp/su 2010) and the most recent pilot (sp 2011) on several variables. For example, during the first two quarters of the Math 91 redesign, nearly 90% of students agreed that students in the course helped each other learn. This dropped to 69% in the spring quarter. Pass rates also slipped in spring quarter Math 91 to

below 60%. We have discussed this and are uncertain if this is an artifact of spring quarter or due to instructors reverting back to familiar pedagogies. The team will further analyze the data at the summer institute and determine next steps in terms of data collection and dissemination, and how the data will be incorporated into the FIGs.

**3B. With respect to faculty perspectives and behaviors related to project goals, what evidence have you gathered or compiled to date? How have you used (or how do you plan to use) that evidence to inform the work of your project?**

Instructors of Math 81 and 91 have consistently reported their data on student achievement and attended the FIG meetings. They have actively requested, modified, used materials from colleagues to address the curricular goals of making the math content relevant to students and helping students develop college-readiness skills. Participation in FIG activities has been mixed, and collectively seems proportional to the level of insistence/nagging on the part of the lead instructor. All instructors used CATs and participated in reciprocal observations in fall quarter, with fewer doing so in subsequent quarters.

Faculty are reporting that they feel the new curriculum aligns better with the needs of our student population, and provides faculty with more opportunities to help students see math as truly relevant to them. More faculty are recognizing their role in helping students develop the attributes necessary to be successful in college. We have also seen an increase in conversations about strategies for formative assessment, which grew out of the initial work with CATs. All instructors have complied with our data requests, and we believe most read the quarterly reports on student achievement and satisfaction. That said, many instructors do not view success rates of 50 to 60 percent as problematic; and there is no means of requiring instructors to take steps to improve student learning. For example, efforts to coordinate common final questions have been generally unsuccessful. Such efforts would provide empirical evidence that instructors are capable of achieving higher levels of learning with more students. These findings—specifically, that we have no formal structures to require compliance of any sort—have inspired the department to update and change department policy around expectations for part-time instructors to submit syllabi, to be available by email, and to participate in department-wide assessment efforts (particularly common final questions).

**3C. What additional support do you need from the RPM leadership and evaluation team to help you gather and/or use evidence to assess your project-related work?**

Strategies for measuring impact of training in learning habits  
Appropriate measures for success of our project (Draw from SAI?)  
Effective ways to organize and use student focus groups  
Ways to assess cultural shift in department around habits and beliefs  
Ways to gather substantial evidence of student reasoning that minimizes the amount of



“mining” required (as with video of an entire class period), or disruption of instruction (camera/mike on small groups, or activities that don’t fit well with the condensed nature of a 10-week quarter)

The leadership team should also continue to work with the four-year institutions to develop criteria for “college-math readiness” that does not require the traditional algebra sequence.

## Section 4

### Budget Narrative

#### 4A. Description of how funds will be used for Project Development Salaries, Wages, and Benefits.

<b>Project Development Salary and Wages</b>	<b>\$10,456.00</b>	<b>Project Development Employee Benefits</b>	<b>\$4,335.00</b>
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One instructor release time for two quarters (\$6756 salary/ \$3780 benefits) to do grant evaluation work. One \$1000 stipend (plus \$150 benefits) to sociology professor to assist with evaluation. 9 \$100 stipends for three quarters (27 total) for adjust faculty participating in project development work (\$2700 stipends plus \$405 in benefits)

#### 4B. Description of how funds will be used for Project Development Goods and Services.

<b>Project Development Goods and Services</b>	<b>\$1,601.00</b>
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\$1000 to be used to purchase supplies associated with the redesigned curriculum; \$601 to be used to purchase textbooks and other references for mathematics faculty.

#### 4C. Description of how funds will be used for Project Development Building Rental and Utilizations.

<b>Project Development Building Rental &amp; Utilizations</b>	<b>\$0.00</b>
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#### 4D. Description of how funds will be used for Project Development Travel.

<b>Project Development Travel</b>	<b>\$2,000.00</b>
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\$1200 for project member to present results of redesign at the annual conference for the American Mathematical Association of Two-Year Colleges; \$800 for miscellaneous travel associated with the grant.

#### 4E. Description of how funds will be used for Project Development Contracts.

<b>Project Development Contracts</b>	<b>\$0.00</b>
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#### 4F. Description of how funds will be used for Instruction Salaries, Wages, and Benefits.

<b>Instruction Salary and Wages</b>	<b>\$20,268.00</b>	<b>Instruction Employee Benefits</b>	<b>\$11,340.00</b>
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Release time for two instructors per quarter to serve as lead instructors for Math 81 and Math 91 (\$20268 salary/ \$11 340 in benefits)

**4G. Description of how funds will be used for Instruction Goods and Services.**

**Instruction  
Goods and Services    \$0.00**

**4H. Description of how funds will be used for Instruction Building Rental and Utilizations.**

**Instruction  
Building Rental &  
Utilizations                \$0.00**

**4I. Description of how funds will be used for Instruction Travel.**

**Instruction  
Travel                        \$0.00**

**4J. Description of how funds will be used for Instruction Contracts.**

**Instruction  
Contracts                    \$0.00**

**4K. Description of how funds will be used for Administration Salaries, Wages, and Benefits.**

<b>Administration Salary and Wages    \$0.00</b>	<b>Administration Employee Benefits    \$0.00</b>
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**4L. Description of how funds will be used for Administration Goods and Services.**

**Administration  
Goods and Services    \$0.00**

**4M. Description of how funds will be used for Administration Building Rental and Utilizations.**

**Administration  
Building Rental &  
Utilizations                \$0.00**

**4N. Description of how funds will be used for Administration Travel.**

**Administration  
Travel                        \$0.00**

**4O. Description of how funds will be used for Administration Contracts.**

**Administration  
Contracts                    \$0.00**

## Budget

**Organization:** Highline Community College

Activity	Salary and Wages	Employee Benefits	Goods and Services	Building Rental & Utilizations	Travel	Contracts	Total
Project Development	\$10,456.00	\$4,335.00	\$1,601.00	\$0.00	\$2,000.00	\$0.00	\$18,392.00
Instruction	\$20,268.00	\$11,340.00	\$0.00	\$0.00	\$0.00	\$0.00	\$31,608.00
Administration	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$30,724.00	\$15,675.00	\$1,601.00	\$0.00	\$2,000.00	\$0.00	\$50,000.00